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MEMORANDUM FOR: Roy E. Crabtree, Ph.D.
Regional Administrator

FROM: Alex Chester
Director (Acting), Southeast Fisheries Science Center

SUBJECT: Overfishing Status of South Atlantic and Gulf of Mexico Goliath Grouper

This memorandum requests the overfishing status of goliath grouper be changed from "unknown" to "not overfishing" in the First Quarter of the 2007 Report to Congress. The basis for this determination is the 2004 Southeast Data Assessment and Review 6 (SEDAR) assessment, which indicates that it is unlikely goliath grouper is experiencing overfishing. In addition, a subsequent publication by Porch et al. (2004), which updated the methodology used in the SEDAR 6 stock assessment in accordance with recommendations by the SEDAR Review Workshop, indicated that the point estimate of the fishing mortality rate (F) under the moratorium was equal to the reference point suggested by the Gulf of Mexico Fishery Management Council's generic Sustainable Fisheries Act amendment ($F_{50\%}$, the level of *F* associated with a spawning potential ratio of 50%). The fact that the point estimate is equal to the level that defines overfishing implies a 50% chance that overfishing is not occurring.

The Advisory Report contained within SEDAR 6 stated: "Goliath Grouper in south Florida (south of 26° N) are overfished, and overfishing may or may not be occurring, depending on the (unknown) effectiveness of the moratorium. If the moratorium has been at least 90% effective in reducing fishing mortality, overfishing is unlikely."

The F from 1990 forward was originally set by Porch et al. (2003) to 0.01 yr^{-1} to reflect the effect of the harvest moratorium. The SEDAR panel was divided as to whether the actual fishing mortality rate was higher or lower. They suggested bracketing this value by assuming the moratorium was probably not more than 99% effective at reducing F, but at least 90% effective.

The SEDAR panel indicated it was unlikely the goliath grouper moratorium was less than 90% effective as evidenced by restricting sensitivity runs to scenarios with a 90% moratorium effectiveness or greater. The conclusion from the assessment was overfishing ended with the moratorium, albeit with the usual uncertainty associated with all SEDAR assessments.

The SEDAR estimate of F_{MSY} was 0.09 if the moratorium was 90% effective and 0.08 if the moratorium was 99% effective (Table 1). The estimate of $F_{50\%}$, was in both cases 0.05. The fishing mortality rate during 1993 to 2002 was estimated to be 0.026 if the moratorium was 90% effective and 0.002 if the moratorium was 99% effective, indicating that by either measure (F_{MSY} or $F_{50\%}$) overfishing has most likely ended (Table 2). Another signal overfishing has ended is an increasing biomass trend for goliath grouper since the moratorium was put into place in 1990. If the moratorium has been 99% effective, the stock is expected to rebuild to the equilibrium biomass level associated with a 50% SPR ($B_{50\%}$) by 2006. If the moratorium has been 90% effective then the stock would be rebuilt to $B_{50\%}$ in 2010.

Table 1. Biological Reference Points for Goliath Grouper

	Effectiveness of Moratorium ($(F_{before} - F_{after})/F_{before}$)			
	90%		99%	
	Estimate	SE	Estimate	SE
Fmsy (/yr)	0.09	0.0174	0.08	0.0190
$F_{50\% SPR}$ (/yr)	0.05	0.0158	0.05	0.0159
$F_{40\% SPR}$ (/yr)	0.07	0.021	0.07	0.021

Table 2. Goliath Grouper relative biomass and estimated fishing mortality, 1993–2002 with maximum, minimum, and mean for 1950–2002. (Catch was considered unreliable and was not included in the stock assessment.)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	max[1]	min[1]	mean[1]
	Moratorium 90% effective[2]												
B/B_{ref}[3]	0.22	0.25	0.28	0.34	0.41	0.49	0.56	0.62	0.67	0.72	2.27	0.12	0.78
F[4](/yr)	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.254	0.010	0.124
	Moratorium 99% effective[5]												
B/B_{ref}[3]	0.25	0.29	0.33	0.39	0.48	0.57	0.65	0.72	0.79	0.85	2.34	0.14	0.84
F[4](/yr)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.237	0.002	0.111

[1] Statistics based on estimates for entire period 1950-2002.

[2] i.e. fishing-induced mortality under the moratorium has been set for illustrative purposes at 10% of estimated pre-moratorium (1979-1990) fishing mortality.

[3] B_{ref} is taken to be $B_{50\%SPR}$

[4] F for 1990-2002 is the stated proportion (10% or 1%) of the estimated pre-moratorium F.

[5] I.e. fishing-induced mortality under the moratorium has been set for illustrative purposes at 1% of estimated pre-moratorium (1979-1990) fishing mortality

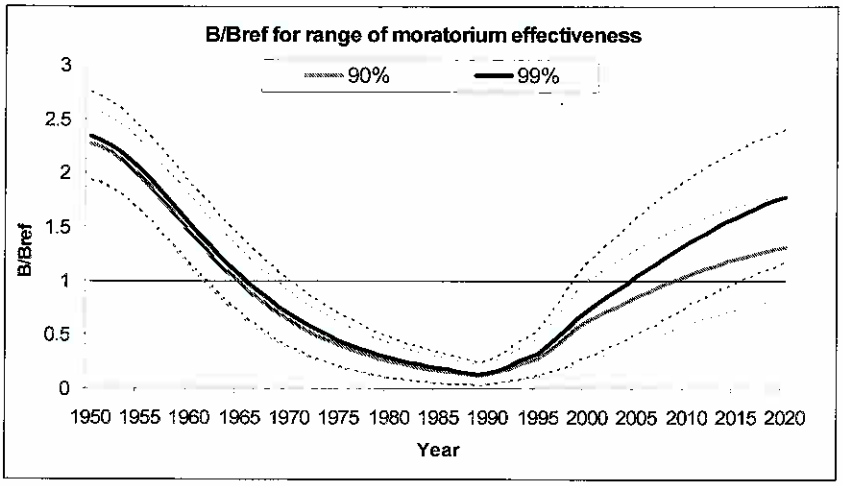

Figure 1. Estimated trend in biomass relative to the reference biomass from 1950 to 2020 for two assumed levels of moratorium effectiveness.

References

Porch, C.E. and A.-M. Ecklund, G.P. Scott. 2003. An assessment of rebuilding times for goliath grouper. SEDAR6-RW3, 26pp.

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SEDAR 6 (2004). Complete Stock Assessment Report of SEDAR 6 Goliath Grouper SEDAR6 Assessment Report 1 SEDAR6-SAR1 2004 SEDAR/SAFMC. One Southpark Circle #306 Charleston, SC 29414. (843) 571-4366.